

5. Note on the Gall-bladder, and some other Points in the Anatomy of the Toucans and Barbets (*Capitonidæ*).
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[Received December 30, 1881.]

The statement has been made, and copied¹, that a gall-bladder is absent in the Toucans. The latest writer on the visceral anatomy of birds, Dr. Hans Gadow², describing the gall-bladder of the "Coccygomorphae," says:—"Rhamphastus compensirt das Fehlen der Blase durch einen sehr laugen (9 cm.) und weiten Ductus Choledochus" (*l. c.* p. 70).

On dissecting, therefore, some months ago a fresh specimen of *Pteroglossus wiedi*, I was considerably surprised to find a peculiarly long and tubular gall-bladder, which lay superficially, covering the other abdominal viscera and extending far down in the abdominal cavity, its fundus nearly reaching the cloacal region of the intestine.

My attention having been thus called to the point, I have since, whenever opportunity has offered, always looked for this viscus, and have now ascertained its presence in specimens of *Rhamphastos carinatus*, *vitellinus*, and *dicolorus*, *Pteroglossus wiedi* (3), *Selenidera maculirostris*, and *Aulacorhamphus prasinus*. The annexed drawing (fig., p. 95) will show its general form and relations, as seen in a fresh specimen of *Rhamphastos dicolorus*. In the specimen figured the total length of the gall-bladder was not less than 4·15 inches. The cystic duct originated ·85 inch from the liver, and was 1·7 inch long. In other cases the duct arises much nearer the portal fissure. Its presence, therefore, in all Toucans is nearly certain³.

It is also present, of exactly the same general form, and with the same relations, in all the Capitoninæ I have examined as regards this point, namely *Megalæma virens* (a fresh specimen), *M. franklini*, and *Xantholema rosea*. Its presence in *Indicator* in a similar form is almost certain, from the intimate relationship of that genus to the Barbets and Toucans. Unfortunately I can give no exact information on this point, the only specimen I have of an *Indicator* having been eviscerated.

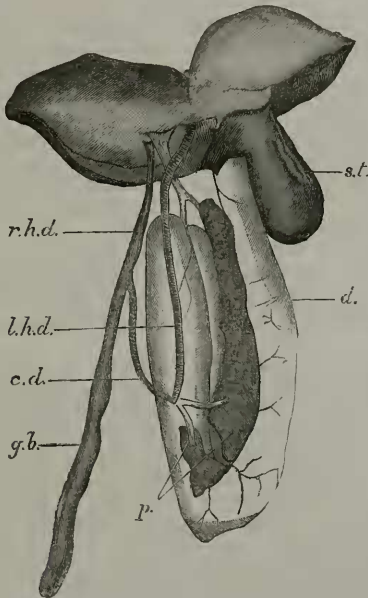
The only other family of birds in which, so far as I am aware, the gall-bladder assumes this peculiar vermiform shape, and lies

¹ Owen, *Anat. Vert.* ii. p. 177; Macalister, *Morph. Vert.* p. 194; Crisp, *P. Z. S.* 1862, p. 137.

² "Versuch ein. vergleich. Anatomie des Verdauungssystemes d. Vögel," *Jen. Zeitschr.* xiii. n. F. vi.

³ It is but due to the late Prof. Garrod to say that he also had noted this peculiar gall-bladder, aptly characterized by him as "intestinform," in several Toucans dissected by him, including *R. Cuvieri* and *carinatus* and *P. wiedi*. It is also, I find, correctly described by Meckel ('*Traité général*,' &c., Paris, 1838, t. viii. p. 289), as follows:—"La conformation de la vésicule est extrêmement curieuse chez le toucan (*Ramphastos*). Elle y est d'une longueur si énorme, qu'elle occupe la cavité abdominale toute entière: elle est très rétrécie, et ressemble plutôt à un cæcum qu'à une vésicule." I made my first observations unaware of either of the above facts.

freely in the abdominal cavity, is that of the Picidæ. Nitzsch¹ describes the liver of the Woodpeckers (of which he examined *Gecinus viridis* and *canus*, *Dryocopus major*, *medius*, and *minor*, and *Picus martius*) as being "immer mit ausgezeichnet langer darmförmiger Gallblase;" and I can quite confirm this description as being



Liver, stomach, duodenum, &c., of *Rhamphastos dicolorus*, from in front, showing the peculiar intestinform gall-badder (*g. b.*)

St., stomach; *d.*, duodenum; *p.*, pancreas; *r. h. d.*, *l. h. d.*, right and left hepatic ducts; *c. d.*, cystic duct.

applicable to the last-named species. Garrod also correctly noted, in his MSS., the "long intestinform gall-bladder" of *Gecinus*. The similarity, therefore, in this respect of the Capitonidæ² to the Picidæ strengthens the many arguments for the intimate relationship of these two groups. And I may take this opportunity to point out some further peculiarities which these birds have in common with each other. These are:—

(1) The great extent of the deltoid muscle, which extends down the entire length, or very nearly so, of the humerus, and is inserted

¹ In Naumann's Orn. Deutschlands, v. p. 252.

² I use this term, with Garrod (Coll. Papers, p. 464) to include the Toucans and *Indicator*, as well as the true Barbets.

by a tendinous slip into a small tubercle on the external surface of that bone, close to the elbow, and just above the tubercle for the tendon of origin of the *extensor metacarpi radialis longior* muscle. This is common to the Picidæ, *Indicator*, and the Toucans and Barbets. As long ago noticed by Nitzsch¹, this peculiarly long deltoid also occurs in the Passeres; but its similar condition in the Capitonidæ has not, I think, before been observed. But, as showing that the similarity in this respect of the Passeres to the Picidæ and their allies is not necessarily a mark of relationship, I may add that in some other birds, as, e. g., *Carpophaga*, *Ptilopus*, and *Cariama*, the deltoid is nearly the same in size and shape, extending down to very near the elbow.

(2) The presence of a distinct ossicle, of the nature of a sesamoid, the so-called "*scapula accessoria*," which is developed in the scapulo-humeral ligament of the shoulder-joint, and plays over the posterior angle of the humerus-head. From it arise some of the fibres of the deltoid.

Nitzsch, with his usual accuracy², had also noticed the existence in the Picidæ of this bone, which, as is well known, occurs also in the Passeres; but the relationships of the bone in the last are not the same as they are in the Picidæ, *Indicator* and other *Pici* I have examined.

In the Passeres the bone in question becomes connected with the tendon of the *pectoralis secundus* muscle as this courses over the head of the humerus towards its insertion, sending round it a special thin tendinous loop, in which the tendon of that muscle plays. Hence, in the undisturbed position of these parts, the *pectoralis* tendon is seen to be somewhat L-shaped, the angle of the L being at the place where it is connected by this fibrous loop to the sesamoid bone, and so dragged backwards out of a direct course.

In the *Pici* I have been able to find no such connection between the *scapula accessoria* and the *pectoralis secundus* tendon, which remains quite free from it throughout its course.

The additional points of resemblance detailed in the present communication render the near relationship of the Picidæ to the Capitonidæ even more certain than before. Nitzsch, from pterylographical grounds, and Kessler³, from osteological ones, long ago pointed out this connection, which was afterwards remarkably confirmed by Garrod's observations on their myology and visceral anatomy.

The fact that there should be important cranial differences between the two groups (and even amongst the members of one of these) only shows that the cranial structure of a bird may be profoundly changed, in accordance with its conditions of existence, whilst in the rest of its organs no change whatever is effected; and such a fact must of itself tell heavily against the view that the structure of the skull in birds is of itself alone a certain, or even sufficient, index to their systematic classification.

¹ Zeitschr. f. ges. Naturwiss. 1862, xix. p. 400.

² *Tom. supra cit.* p. 399.

³ Bull. Soc. Imp. Nat. Moscou, xvii. pp. 332-334, 340.

January 17, 1882.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The following report on the additions to the Society's Menagerie during the month of December 1881 was read by the Secretary:—

The total number of registered additions to the Society's Menagerie during the month of December 1881 was 82, of which 8 were by birth, 39 by presentation, 26 by purchase, and 9 were received on deposit. The total number of departures during the same period, by death and removals, was 82.

The most noticeable additions during the month were:—

1. A young male Guemul Deer (*Furcifer chilensis*), from Patagonia, purchased December 22nd of the Jardin d'Acclimatation of Paris.

This animal has lately shed its horns, and is now growing a new pair.

2. A Germain's Peacock-Pheasant (*Polyplectron germaini*), purchased December 24th.

Both these accessions are of species new to the Society's series.

Prof. Newton exhibited, by favour of Messrs. Hallett & Co., the skin and bones of the trunk of a specimen of *Notornis mantelli*, recently received by them from New Zealand, and stated to have been obtained in the province of Otago about eighteen months ago. Prof. Newton pointed out that the sternum figured in the Society's 'Transactions' (vol. iv. pl. 4. figs. 5-8) as of this species must belong to a totally different form.

Prof. W. K. Parker, F.R.S., read a memoir on the skull of the Crocodilia, of which the following is an abstract:—

"The Crocodilia have seen the rise and fall of several Reptilian dynasties, and even now they are in no danger of extinction. Their development is precisely like that of the Sauropsida generally (the other Reptiles, and Birds); but in some very important respects they anticipate cranial modifications that only come to perfection in the Mammalia.

"It is difficult, at first, to see in what their embryo differs from that of a bird; but the long tail is diagnostic; this, however, would not always have served that purpose, as the avian contemporaries of the Crocodiles of the Oolite had tails relatively as long as those of the Crocodiles.

"The near approach to that modification of the skull which is seen in the Bird is very remarkable in the early stages of the Crocodile; but whilst the one becomes as light as a quill, the other becomes as heavy as the armour of a Tortoise; yet in the adult Crocodile the whole hind skull is a labyrinth of air-cavities, which

differ but little from those of a bird. Notwithstanding the massive-ness of the skull, nearly every suture is persistent; in the light skull of the Bird nearly every suture is obliterated.

“The pier of the mandible explains, and is explained by, that of the Lizard on one side, and the Salamandrian below. The jaw itself is at an early period quite continuous with the hyoid arch; and that arch is for a time continuous with the auditory *columella*, as in the *Hatteria* of New Zealand; and the *columella* itself is only a modified part of that arch. In its early segmented state, however, and in its later broken-up condition, it comes very near to what is found in the mammal, and greatly helps the morphologist in working out a harmony between this arch in the Sauropsida and the Mammalia.

“In the discussion which took place a dozen years ago between Professors Peters and Huxley (for the views of the latter see P. Z. S. 1869, pp. 391–407), as to the early continuity of the mandibular and hyoid arches and their nature, both combatants were right and both were wrong. The two arches *are* continuous for a time; but that condition does not sustain Prof. Peters’s *reasoning*. The deductions of Prof. Huxley, in spite of the fact that he worked with imperfect materials, will remain true for all time.”

Prof. Parker’s memoir will be published entire in the Society’s Transactions.’

The following papers were read:—

1. On a Collection of Rodents from North Peru. By
OLDFIELD THOMAS, F.Z.S., British Museum.

[Received December 15, 1881.]

(Plate IV.)

The collection now described was obtained by M. Stolzmann, the well-known Polish collector, in Northern Peru, and has been placed in my hands for determination by Prof. Taczanowski, of the Warsaw Museum, by whom a nearly complete set has been presented to the British Museum.

Every specimen has its exact locality, date, and altitude recorded; and the habits of many of the species have been noted by M. Stolzmann, whose remarks, placed between quotation-marks, are appended to their respective species.

The localities from which the collection was obtained are as follows:—

Tumbez.—Capital of the province of the same name. Situated on the river Tumbez, at about 4 miles from its outlet in the Bay of Guayaquil (3° S. lat.).

Tambillo.—A colony on the river Malleta, a tributary of the Upper Amazons. This river forms the boundary between the pro-